REMARKS/ARGUMENTS

Claims 1-14 are pending. By this Amendment, claims 1-4 and 6-13 are amended, claim 14 is added, and the Abstract is replaced. Reconsideration in view of the above amendments and the following remarks is respectfully requested.

In paragraph 1 of the Office Action, the Abstract is objected to. By this Amendment, the Abstract submitted with the Preliminary Amendment of May 10, 2005 is replaced with the Abstract attached hereto.

The drawings were objected to based on failure to disclose a "ring of flames." By this Amendment, the claimed "rings of flames" has been changed to "flame distribution rings" which are clearly shown in the drawings.

Reconsideration and withdrawal of the objections are respectfully requested.

In paragraphs 3, 4 and 6, various objections and rejections were applied to claims 1, 3, 5, 8, 9 and 12. By this Amendment, claims 1, 3, 8, 9 and 12 have been amended for clarity only. With respect to claim 5, Applicant respectfully traverses the rejection since claim 5 sets forth a finite number of discernable and defined structural possibilities, and thus satisfies the requirements of 35 U.S.C. §112, second paragraph. In particular, the horizontal mixing chamber of the means for feeding said at least one external body and/or of the means for feeding the central body are obtained in said at least one external body and/or in said central body.

Reconsideration and withdrawal of the objections and rejections are respectfully requested.

Claims 1-6 and 10-13 were rejected under 35 U.S.C. §102(b) over De'Longhi et al. (EP 0485645). This rejection is respectfully traversed. As a preliminary matter, the Venturi effect is the phenomenon for which a fluid passing through smoothly varying constrictions is subject to

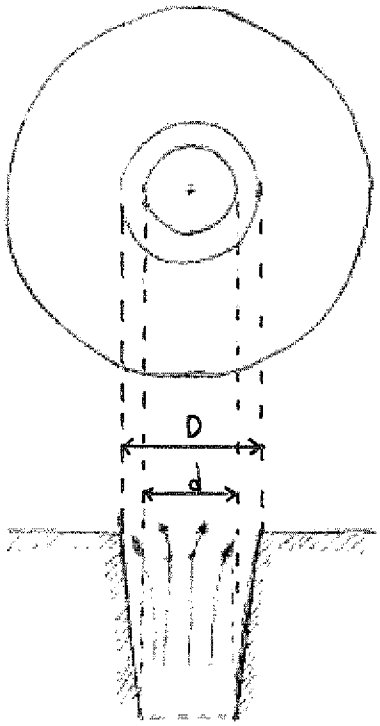
changes in velocity and pressure in order to satisfy the conservation law of mass-flux (flow rate). In the smallest constriction, the fluid undergoes the maximum acceleration (highest speed) and the minimum pressure. Likewise, as the fluid leaves the smallest constriction, it is slowed by a pressure grade force that raises the pressure back to ambient level. Minimum pressure in the smallest constriction means that the depression occurs upstream, the depression being used in the gas burners to suck primary air from the external environment.

Typically, the Venturi effect is effected via a tube with a reduced section interposed between a smoothly convergent part and a smoothly divergent part. The fluid flows axially, i.e., it does not sharply change directions during its flow in the tube and thus, a Venturi effect is obtained when the fluid flows through the tube without sharply changing its direction of motion.

Domestic gas burners having mixing chambers with axial Venturi effect are known, for example, see the gas burner disclosed in De'Longhi et al., Figure 2. De'Longhi et al. comprises two mixing chambers with axial Venturi effect for feeding the gas/primary air mixture to the two flame crowns of the burner, respectively.

Each mixing chamber with axial Venturi effect disclosed in De'Longhi et al. consists of a classical Venturi tube comprising one vertical duct (10, 11) having a circular cross-section gradually increasing from the lowest section to the upper section thereof. In other words, each Venturi tube comprises a vertical duct shaped as a truncated cone, the larger base thereof being placed upward having regard to the smaller base, per column 3, lines 25-32 of De'Longhi et al. The reduced section of each axial Venturi tube, through which gas and primary air flow in a perpendicular way, coincides to the smaller base of the truncated cone, i.e., a circle having a diameter d, while the most enlarged section of the Venturi tube coincides with the larger section

of the truncated cone, i.e., a circle with diameter D. Applicant provides sketches below to assist understanding.



As will be clear, the fluids (gas and air) flowing through the axial Venturi tube are not subjected to sharp changes of direction, as they flow substantially along one in the same direction, spreading along the truncated cone as the diameter increases.

The area of the reduced section of the Venturi tube, i.e., of the small space of the truncated cone is equal to:

$$A_r = \pi \cdot \left(\frac{d}{2}\right)^2$$

and the area of the most enlarged section of the Venturi tube is:

$$A_m = \pi \cdot \left(\frac{D}{2}\right)^2 .$$

Gas burners provided with mixing chambers having a radial Venturi effect are also known, for example, from FR 1,197,178 (Figure 1 provided below).

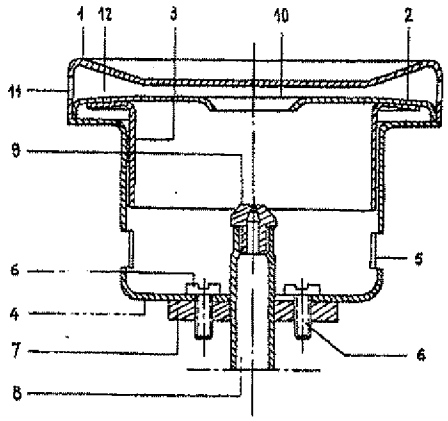


Fig. 1

This kind of mixing chamber is different from the mixing chamber with axial Venturi effect, e.g., the truncated cone is replaced with a horizontal circular chamber 10 of limited height that is placed immediately downstream of the vertical inflow duct. This means that the fluids flowing through the radial Venturi tube are forced to sharply change their direction (from a vertical direction to a horizontal direction) before expanding in the horizontal circular chamber.

In this arrangement, circular chamber fluids expand radially from the center to the periphery of the chamber, thus the most enlarged section of the radial Venturi tube coincides with the cylindrical surface of the periphery of the chamber (remote from the vertical inflow duct), and the reduced section of the radial Venturi tube coincides with the cylindrical surface surrounding the outflow aperture of the vertical inflow duct.

In other words, the fluids flow through the vertical inflow duct, sharply change their flow direction, pass through a reduced section area, and expand radially in the horizontal circular chamber. This physical behavior might be evidenced by fluid dynamics simulations using finite elements method. In regard to the sketch provided below, please note that the area of the reduced section of this kind of mixing chamber is:

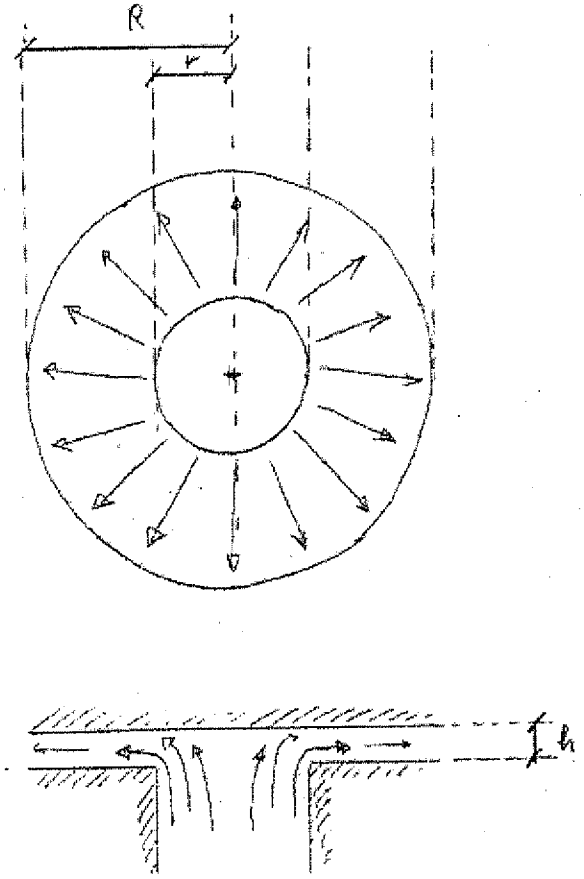
$d = 2 \cdot r$

$A_r = \pi \cdot d \cdot h$

while the area of the most enlarged section of the radial Venturi is the following:

$D = 2 \cdot R$

$A_m = \pi \cdot D \cdot h$



As can be easily appreciated, the physical behavior of the two kinds of Venturi mixing chambers is very different, and thus design, technical peculiarities and performances greatly vary from an axial Venturi to a radial Venturi.

In view of the above explanation, it should be clear that De'Longhi et al. refers to a gas burner with two concentric flame rings 4, 5 which are separately fed by two respective Venturi tubes 10, 11 having axial Venturi effect. The Venturi tubes 10, 11 are provided with vertical mixing chambers having a truncated cone configuration, which produces an axial Venturi effect, as described above.

Moreover, the in the burner described by De'Longhi et al., primary air is sucked within the burner by the axial Venturi tube 10, 11 from below the cooking hob (see solid arrows as depicted in Figure 2 in the vicinity of reference element "29", while the dashed-line arrows (e.g., in the vicinity of reference element "7") refer to the secondary air).

Accordingly, the external flame ring 4 disclosed in De'Longhi et al. is not fed by a horizontal mixing chamber since it is fed by a vertical Venturi tube 11 whose mixing chamber is the truncated cone portion of the tube 11. Further, the Venturi tube 11 described in De'Longhi et al. is shaped in such a way as to produce an axial Venturi effect, as stated above, instead of a radial Venturi effect, as claimed.

Therefore, the subject matter of claim 1 is novel over De'Longhi et al. since the burner claimed recites a horizontal mixing chamber and a Venturi tube with radial Venturi effect.

Reconsideration and withdrawal of the rejection are respectfully requested.

Claims 7 and 8 were rejected under 35 U.S.C. §103(a) over De'Longhi et al. In addition, claim 9 was rejected under 35 U.S.C. §103(a) over De'Longhi et al. in view of Bettinzoli et al. (WO 02/02991). These rejections are respectfully traversed.

These secondary references do not teach or suggest to use more than one radial Venturi tube in a domestic gas burner. Specifically, the secondary references do not induce the person of

ordinary skill in the art dealing with the problem of providing mixing chambers for domestic gas burners having two or more flame crowns to be separately fed, to consider axial Venturi tubes.

Using radial Venturi tubes instead of axial Venturi tubes in multiple flame crown gas burner is not a mere matter of design choice. For example, the use of radial Venturi tubes involves many substantial changes in the thermodynamic conditions (e.g., the flow rate, pressure speed and temperature conditions of the gas/primary air mixture) of the entire gas burner. Such changes in the thermodynamic conditions of the burner were not faced in the applied prior art documents and thus the relevant technical effect was not predictable in advance.

It is also clearly evident that radial Venturi tubes were considered to be unsuitable to provide the correct thermodynamic conditions of the gas/primary air mixture, as well as the correct mixing and diffusion conditions of such a mixture, in a multiple flame crown gas burner in which the flame crowns are to be fed separately. As cited in published paragraph 20 of the present U.S. application, "the use of the horizontal mixing chamber with radial Venturi effect as a means for feeding the rings of circumferential flames involves ... also [surprisingly] an efficacious mixing of the primary air with the gas fuel and an excellent subsequent distribution of the mixture ...". Such a technical effect was not predictable at the time of filing the present application.

Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

In view of the above amendments and remarks, Applicant respectfully submits that all the claims are patentable and that the entire application is in condition for allowance.

Should the Examiner believe that anything further is desirable to place the application in better condition for allowance, he is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: /Paul T. Bowen/
Paul T. Bowen
Reg. No. 38,009

PTB:jck
Attachment:
Replacement Abstract

901 North Glebe Road, 11th Floor
Arlington, VA 22203-1808
Telephone: (703) 816-4000
Facsimile: (703) 816-4100